US009471332B2

(12) **United States Patent**
Li et al.

(10) **Patent No.: US 9,471,332 B2**
(45) **Date of Patent: Oct. 18, 2016**

(54) **SELECTING GRAPHICAL COMPONENT TYPES AT RUNTIME**

(75) Inventors: **Xin Li**, Austin, TX (US); **Gregory Wayne Roberts**, Pflugerville, TX (US)

(73) Assignee: **International Business Machines Corporation**, Armonk, NY (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 900 days.

(21) Appl. No.: **10/967,958**

(22) Filed: **Oct. 19, 2004**

(65) **Prior Publication Data**

US 2006/0085754 A1 Apr. 20, 2006

(51) **Int. Cl.**
G06F 9/44 (2006.01)

(52) **U.S. Cl.**
CPC ***G06F 9/4443*** (2013.01)

(58) **Field of Classification Search**
CPC G06F 9/4443
USPC 715/762, 763, 760, 764–765
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,754,173	A	*	5/1998	Hiura et al.	715/744
5,764,226	A	*	6/1998	Consolatti et al.	715/747
5,806,080	A	*	9/1998	Purple et al.	715/515
5,818,445	A	*	10/1998	Sanderson et al.	715/744
5,889,942	A	*	3/1999	Orenshteyn	726/3
5,905,492	A	*	5/1999	Straub et al.	715/744
5,917,487	A	*	6/1999	Ulrich	715/765
5,959,624	A	*	9/1999	Johnston et al.	715/746
6,072,486	A	*	6/2000	Sheldon et al.	715/835
6,105,066	A	*	8/2000	Hayes, Jr.	709/226
6,128,010	A	*	10/2000	Baxter et al.	715/846
6,188,399	B1	*	2/2001	Voas et al.	715/723
6,219,032	B1	*	4/2001	Rosenberg et al.	345/157
6,278,448	B1	*	8/2001	Brown et al.	715/866
6,278,449	B1	*	8/2001	Sugiarto et al.	715/826
6,327,628	B1	*	12/2001	Anuff et al.	719/311
6,342,907	B1	*	1/2002	Petty et al.	715/762
6,392,671	B1	*	5/2002	Glaser	715/765
6,628,305	B1	*	9/2003	Hong et al.	715/734
6,664,981	B2	*	12/2003	Ashe et al.	715/765
6,677,962	B1	*	1/2004	Bailey	G06F 9/4443 715/744
6,686,934	B1	*	2/2004	Evans et al.	715/764
6,724,403	B1	*	4/2004	Santoro et al.	715/765
6,753,885	B2	*	6/2004	Stoakley et al.	715/762
6,859,212	B2	*	2/2005	Kumar et al.	715/744
6,901,554	B1	*	5/2005	Bahrs et al.	715/526
6,941,521	B2	*	9/2005	Lin et al.	715/762
6,968,449	B1	*	11/2005	Sierra et al.	713/1
6,990,654	B2	*	1/2006	Carroll, Jr.	717/109
7,030,890	B1	*	4/2006	Jouet et al.	345/619
7,243,336	B2	*	7/2007	Brockway et al.	717/120
7,380,236	B2	*	5/2008	Hawley	G06F 9/4443 717/109
7,603,624	B2	*	10/2009	Bent et al.	715/744
7,657,842	B2	*	2/2010	Matthews et al.	715/788
7,681,112	B1	*	3/2010	Francis	715/201

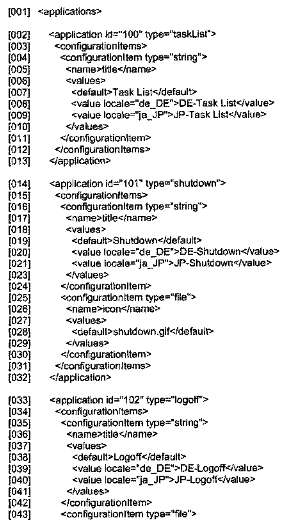
(Continued)

Primary Examiner — Amy Ng
Assistant Examiner — William Wong
(74) *Attorney, Agent, or Firm* — Yee & Associates, P.C.; Stephen Yoder

(57) **ABSTRACT**

A system, apparatus and method of selecting graphical component types at runtime are provided. When a graphical component is to be displayed in a GUI, which usually has a type, the type of the GUI is first determined. Type in this case used to signify a look, feel and behavior that are to be exhibited by the graphical component. After determining the type of the GUI, the graphical component may be created based on the type of the GUI. After it has been created, the graphical component will be displayed in the GUI.

19 Claims, 11 Drawing Sheets



```
<applications>

    <application id="100" type="taskList">
      <configurationItems>
        <configurationItem type="string">
          <name>title</name>
          <values>
            <default>Task List</default>
            <value locale="de_DE">DE-Task List</value>
            <value locale="ja_JP">JP-Task List</value>
          </values>
        </configurationItem>
      </configurationItems>
    </application>

    <application id="101" type="shutdown">
      <configurationItems>
        <configurationItem type="string">
          <name>title</name>
          <values>
            <default>Shutdown</default>
            <value locale="de_DE">DE-Shutdown</value>
            <value locale="ja_JP">JP-Shutdown</value>
          </values>
        </configurationItem>
        <configurationItem type="file">
          <name>icon</name>
          <values>
            <default>shutdown.gif</default>
          </values>
        </configurationItem>
      </configurationItems>
    </application>

    <application id="102" type="logoff">
      <configurationItems>
        <configurationItem type="string">
          <name>title</name>
          <values>
            <default>Logoff</default>
            <value locale="de_DE">DE-Logoff</value>
            <value locale="ja_JP">JP-Logoff</value>
          </values>
        </configurationItem>
        <configurationItem type="file">
```

(56) **References Cited**

U.S. PATENT DOCUMENTS

2001/0043235	A1*	11/2001	Best et al.	345/781
2001/0045961	A1*	11/2001	Stoakley et al.	345/744
2001/0048448	A1*	12/2001	Raiz et al.	345/700
2001/0051907	A1*	12/2001	Kumar et al.	705/36
2001/0051961	A1*	12/2001	Duxbury	707/517
2002/0023122	A1*	2/2002	Polizzi et al.	709/202
2002/0057290	A1*	5/2002	Wilkinson et al.	345/744
2002/0080200	A1*	6/2002	Wong et al.	345/969
2002/0101448	A1*	8/2002	Sanderson	345/762
2002/0113777	A1*	8/2002	Lauderdale	345/168
2002/0120673	A1*	8/2002	Tolson et al.	709/202
2002/0129106	A1*	9/2002	Gutfreund	709/205
2002/0130900	A1*	9/2002	Davis	345/744
2002/0138331	A1*	9/2002	Hosea et al.	705/10
2002/0149618	A1*	10/2002	Estrada et al.	345/760
2002/0149629	A1*	10/2002	Craycroft	G06F 9/4443 715/861
2002/0188434	A1*	12/2002	Shulman et al.	703/21
2003/0020671	A1*	1/2003	Santoro et al.	345/1.3
2003/0046401	A1*	3/2003	Abbott et al.	709/228
2003/0055878	A1*	3/2003	Fletcher et al.	709/203
2003/0070061	A1*	4/2003	Wong et al.	712/220
2003/0073063	A1*	4/2003	Dattaray et al.	434/350
2003/0110448	A1*	6/2003	Haut et al.	715/513
2003/0117437	A1*	6/2003	Cook et al.	345/764
2003/0158975	A1*	8/2003	Frank et al.	709/331
2003/0167315	A1*	9/2003	Chowdhry et al.	709/218
2003/0189597	A1*	10/2003	Anderson et al.	345/778
2004/0003096	A1*	1/2004	Willis	709/228
2004/0003097	A1*	1/2004	Willis et al.	709/228
2004/0006476	A1*	1/2004	Chiu	G10L 15/22 704/270.1
2004/0046789	A1*	3/2004	Inanoria	345/748
2004/0095378	A1*	5/2004	Vigue et al.	345/723
2004/0107249	A1*	6/2004	Moser et al.	709/204
2004/0113951	A1	6/2004	Brockway	
2004/0155909	A1*	8/2004	Wagner	345/854
2004/0183831	A1*	9/2004	Ritchy et al.	345/762
2005/0021935	A1*	1/2005	Schillings et al.	713/1
2005/0038868	A1*	2/2005	Spicer	709/217
2005/0050301	A1*	3/2005	Whittle et al.	712/32
2005/0108732	A1*	5/2005	Musson	G06F 3/0482 719/328
2005/0114361	A1*	5/2005	Roberts et al.	707/100
2005/0193368	A1*	9/2005	Becker et al.	717/106
2005/0193380	A1*	9/2005	Vitanov et al.	717/143
2006/0005207	A1*	1/2006	Louch et al.	719/328
2006/0015818	A1*	1/2006	Chaudhri et al.	715/779
2006/0168536	A1*	7/2006	Portmann	715/762
2007/0038934	A1*	2/2007	Fellman	715/700
2007/0101297	A1*	5/2007	Forstall et al.	715/841
2007/0106952	A1*	5/2007	Matas et al.	715/764
2007/0203984	A2*	8/2007	AlHusseini et al.	709/205

* cited by examiner

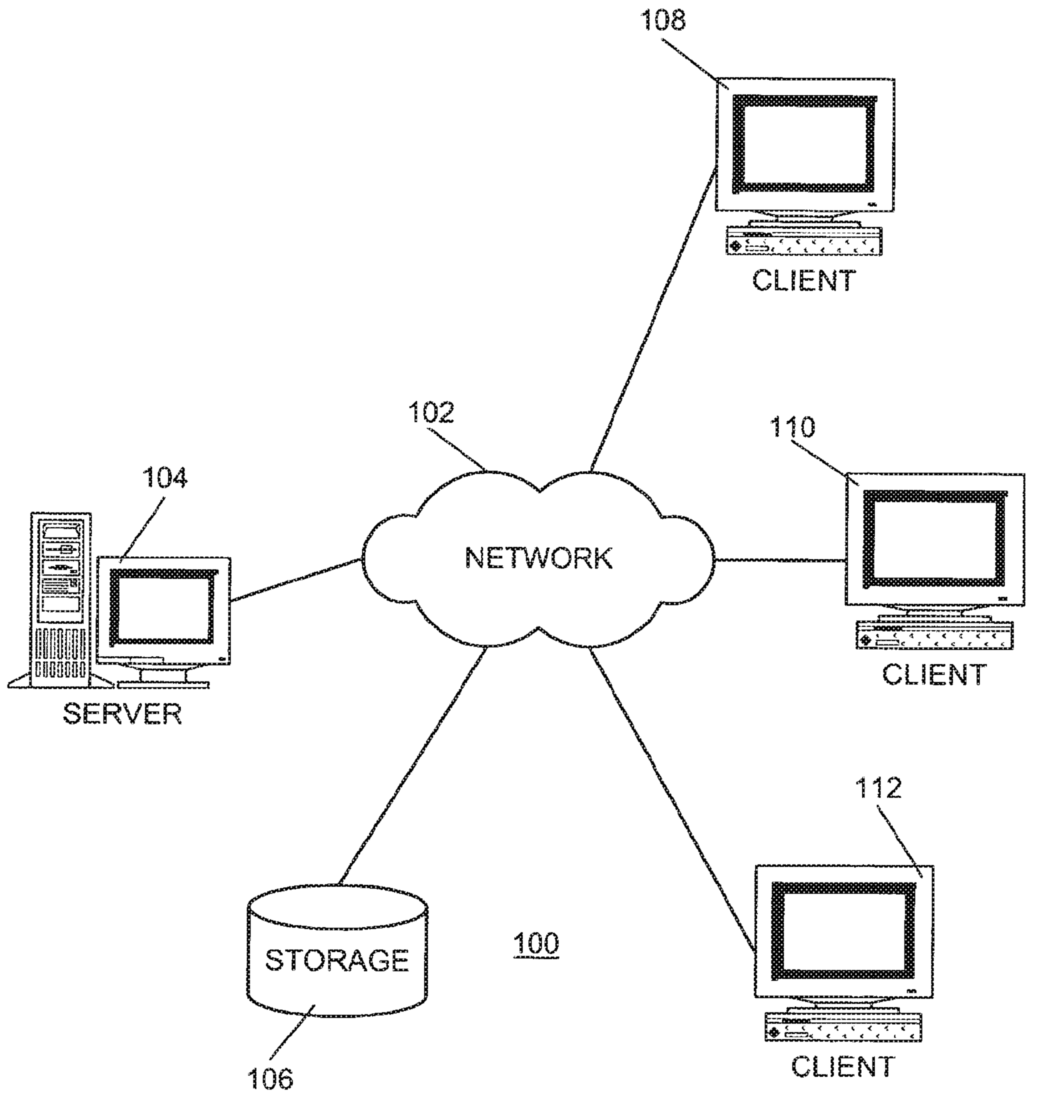

108
CLIENT
102
NETWORK
110
CLIENT
104
SERVER
112
STORAGE
100
CLIENT
106

FIG. 1

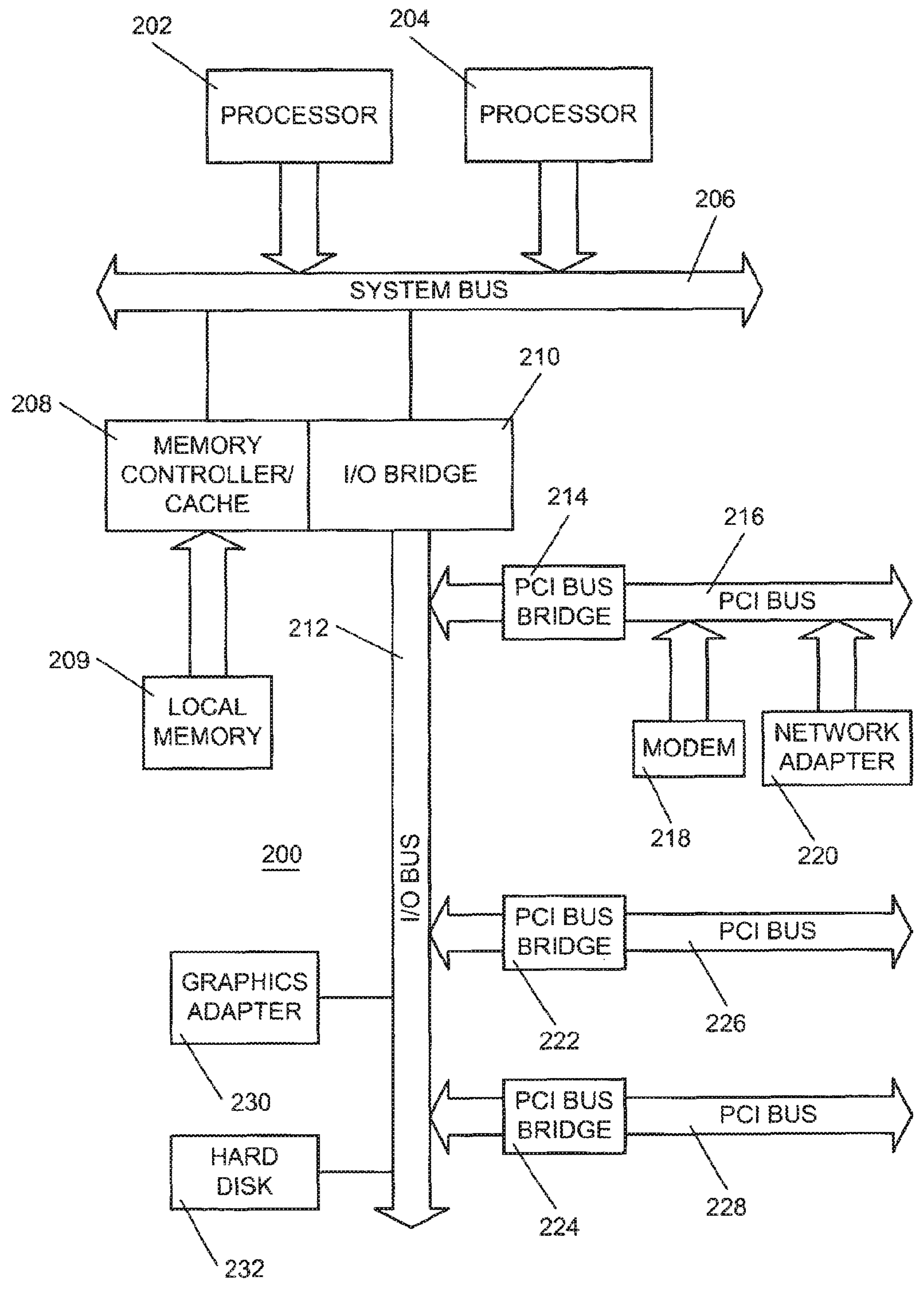

202
204
PROCESSOR
PROCESSOR
206
SYSTEM BUS
210
208
MEMORY CONTROLLER/ CACHE
I/O BRIDGE
214
216
PCI BUS BRIDGE
PCI BUS
212
209
LOCAL MEMORY
MODEM
NETWORK ADAPTER
218
220
200
I/O BUS
PCI BUS BRIDGE
PCI BUS
GRAPHICS ADAPTER
222
226
230
HARD DISK
PCI BUS BRIDGE
PCI BUS
224
228
232

FIG. 2

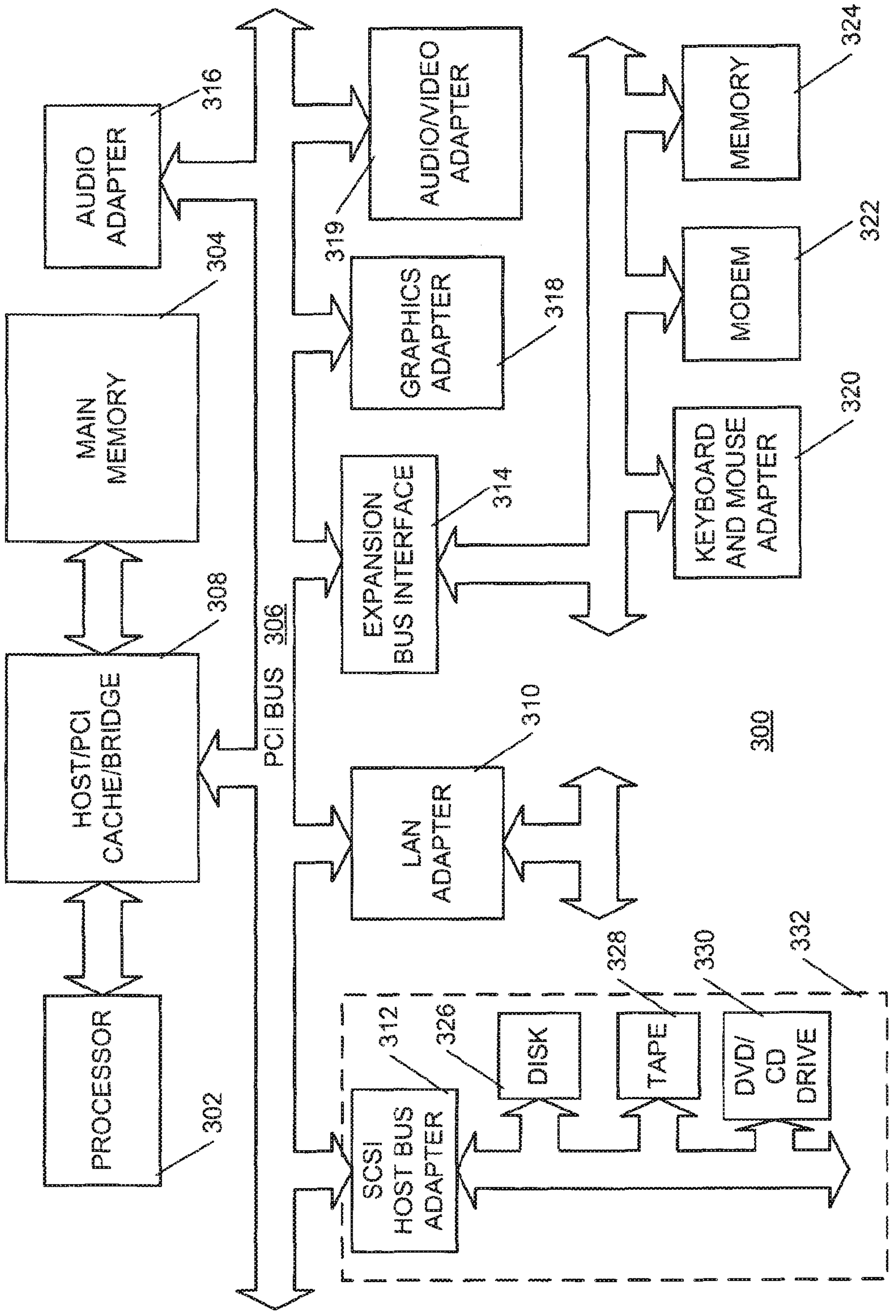

PROCESSOR
302
HOST/PCI CACHE/BRIDGE
308
MAIN MEMORY
304
AUDIO ADAPTER
316
PCI BUS 306
SCSI HOST BUS ADAPTER
312
LAN ADAPTER
310
EXPANSION BUS INTERFACE
314
GRAPHICS ADAPTER
318
AUDIO/VIDEO ADAPTER
319
DISK
326
TAPE
328
DVD/ CD DRIVE
330
332
KEYBOARD AND MOUSE ADAPTER
320
MODEM
322
MEMORY
324
300

FIG. 3

```
[001] <applications>

[002]   <application id="100" type="taskList">
[003]     <configurationItems>
[004]       <configurationItem type="string">
[005]         <name>title</name>
[006]         <values>
[007]           <default>Task List</default>
[008]           <value locale="de_DE">DE-Task List</value>
[009]           <value locale="ja_JP">JP-Task List</value>
[010]         </values>
[011]       </configurationItem>
[012]     </configurationItems>
[013]   </application>

[014]   <application id="101" type="shutdown">
[015]     <configurationItems>
[016]       <configurationItem type="string">
[017]         <name>title</name>
[018]         <values>
[019]           <default>Shutdown</default>
[020]           <value locale="de_DE">DE-Shutdown</value>
[021]           <value locale="ja_JP">JP-Shutdown</value>
[023]         </values>
[024]       </configurationItem>
[025]       <configurationItem type="file">
[026]         <name>icon</name>
[027]         <values>
[028]           <default>shutdown.gif</default>
[029]         </values>
[030]       </configurationItem>
[031]     </configurationItems>
[032]   </application>

[033]   <application id="102" type="logoff">
[034]     <configurationItems>
[035]       <configurationItem type="string">
[036]         <name>title</name>
[037]         <values>
[038]           <default>Logoff</default>
[039]           <value locale="de_DE">DE-Logoff</value>
[040]           <value locale="ja_JP">JP-Logoff</value>
[041]         </values>
[042]       </configurationItem>
[043]       <configurationItem type="file">
```

FIG. 4(a)

```
[045]         <values>
[046]           <default>logoff.gif</default>
[047]         </values>
[048]       </configurationItem>
[049]     </configurationItems>
[050]   </application>

[051]   <application id="103" type="lockup">
[052]     <configurationItems>
[053]       <configurationItem type="string">
[054]         <name>title</name>
[055]         <values>
[056]           <default>Lockup</default>
[057]           <value locale="de_DE">DE-Lockup</value>
[058]           <value locale="ja_JP">JP-Lockup</value>
[059]         </values>
[060]       </configurationItem>
[061]       <configurationItem type="file">
[062]         <name>icon</name>
[063]         <values>
[064]           <default>lockup.gif</default>
[065]         </values>
[066]       </configurationItem>
[067]     </configurationItems>
[068]   </application>

[069]   <application id="104" type="exit">
[070]     <configurationItems>
[071]       <configurationItem type="string">
[072]         <name>title</name>
[073]         <values>
[074]           <default>Exit</default>
[075]           <value locale="de_DE">DE-Exit</value>
[076]           <value locale="ja_JP">JP-Exit</value>
[077]         </values>
[078]       </configurationItem>
[079]       <configurationItem type="file">
[080]         <name>icon</name>
[081]         <values>
[082]           <default>logoff.gif</default>
[083]         </values>
[084]       </configurationItem>
[085]     </configurationItems>
[086]   </application>
```

FIG. 4(b)

```
[087]    <application id="201" type="native">
[088]      <configurationItems>
[089]        <configurationItem type="string">
[090]          <name>title</name>
[091]          <values>
[092]            <default>Manage Files</default>
[093]            <value locale="de_DE">DE-Manage Files</value>
[094]            <value locale="ja_JP">JP-Manage Files</value>
[095]          </values>
[096]        </configurationItem>
[097]        <configurationItem type="composite">
[098]          <name>win32</name>
[099]          <configurationItems>
[100]            <configurationItem type="string">
[101]              <name>command</name>
[102]              <values>
[103]                <default>explorer.exe</default>
[104]              </values>
[105]            </configurationItem>
[106]          </configurationItems>
[107]        </configurationItem>
[108]        <configurationItem type="composite">
[109]          <name>linux</name>
[110]          <configurationItems>
[111]            <configurationItem type="string">
[112]              <name>command</name>
[113]              <values>
[114]                <default>nautilus</default>
[115]              </values>
[116]            </configurationItem>
[117]            <configurationItem type="string">
[118]              <name>arguments</name>
[119]              <values>
[120]                <default>--no-desktop</default>
[121]              </values>
[122]            </configurationItem>
[123]          </configurationItems>
[124]        </configurationItem>
[125]      </configurationItems>
[126]    </application>

[127]  <application id="300" type="web">
[128]        <configurationItems>
[129]         <configurationItem type="string">
```

FIG. 4(c)

```
[130]          <name>title</name>
[131]          <values>
[132]            <default>Embedded Browser (IE)</default>
[133]            <value locale="de_DE">DE-Embedded Browser (IE)</value>
[134]            <value locale="ja_JP">JP-Embedded Browser (IE)</value>
[135]          </values>
[136]        </configurationItem>
[137]        <configurationItem type="string">
[138]          <name>embeddedBrowser</name>
[139]          <values>
[140]            <default>MSIE</default>
[141]          </values>
[142]        </configurationItem>
[143]        <configurationItem type="string">
[144]          <name>initialURL</name>
[145]          <values>
[146]            <default>http://www.eclipse.org</default>
[147]          </values>
[148]        </configurationItem>
[149]      </configurationItems>
[150]    </application>

[151]        <application id="600" type="java">
[152]      <configurationItems>
[153]        <configurationItem type="string">
[154]          <name>title</name>
[155]          <values>
[156]            <default>Java Application</default>
[157]            <value locale="de_DE">DE-Java Application</value>
[158]            <value locale="ja_JP">JP-Java Application</value>
[159]          </values>
[160]        </configurationItem>
[161]        <configurationItem type="file">
[162]          <name>icon</name>
[163]          <values>
[164]            <default>genspread.gif</default>
[165]          </values>
[166]        </configurationItem>
[167]        <configurationItem type="string">
[168]          <name>arguments</name>
[169]          <values>
[170]            <default>arg1 arg2</default>
[171]          </values>
[172]        </configurationItem>
[173]        <configurationItem type="composite">
```

FIG. 4(d)

```
[174]        <name>win32</name>
[175]        <configurationItems>
[176]          <configurationItem type="string">
[177]            <name>isJar</name>
[178]            <values>
[179]              <default>false</default>
[180]            </values>
[181]          </configurationItem>
[182]          <configurationItem type="string">
[183]            <name>classOrJarName</name>
[184]            <values>
[185]              <default>JavaAppTypeTest</default>
[186]            </values>
[187]          </configurationItem>
[188]          <configurationItem type="string">
[189]            <name>classpath</name>
[190]              <values>

[191]  <default>\IBM\WCIste\bDesktop\lockdown\samples\eclipse\plugins\
com.ibm.wci.samples_1.0.0\data</default>
[192]              </values>
[193]           </configurationItem>
[194]               <configurationItem type="composite">
[195]                   <name>vmargs</name>
[196]                   <configurationItems>
[197]                     <configurationItem type="string">
[198]                       <name>sample_JVM_arg</name>
[199]                       <values>
[200]                         <default>sample_value</default>
[201]                       </values>
[202]                     </configurationItem>
[203]                   </configurationItems>
[204]           </configurationItem>
[205]         </configurationItems>
[206]       </configurationItem>
[207]       <configurationItem type="composite">
[208]         <name>linux</name>
[209]         <configurationItems>
[210]           <configurationItem type="string">
[211]             <name>isJar</name>
[212]             <values>
[213]               <default>false</default>
[214]             </values>
[215]           </configurationItem>
[216]           <configurationItem type="string">
[217]             <name>classOrJarName</name>
```

FIG. 4(e)

```
[218]              <values>
[219]                <default>JavaAppTypeTest</default>
[220]              </values>
[221]            </configurationItem>
[222]            <configurationItem type="string">
[223]              <name>classpath</name>
[224]              <values>


[225] <default>/opt/IBM/WClste/bDesktop/lockdown/samples/eclipse/
       plugins/com.ibm.wci.samples_1.0.0/data</default>
[226]              </values>
[227]            </configurationItem>
[228]          </configurationItems>
[229]        </configurationItem>
[230]      </configurationItems>
[231]    </application>
```

FIG. 4(f)

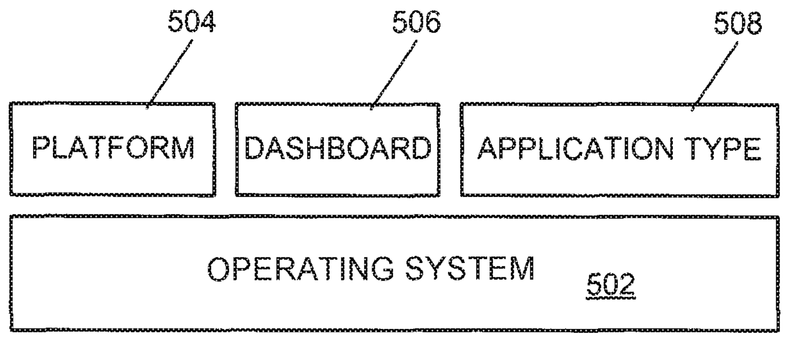

504
506
508
PLATFORM
DASHBOARD
APPLICATION TYPE
OPERATING SYSTEM
502

FIG. 5

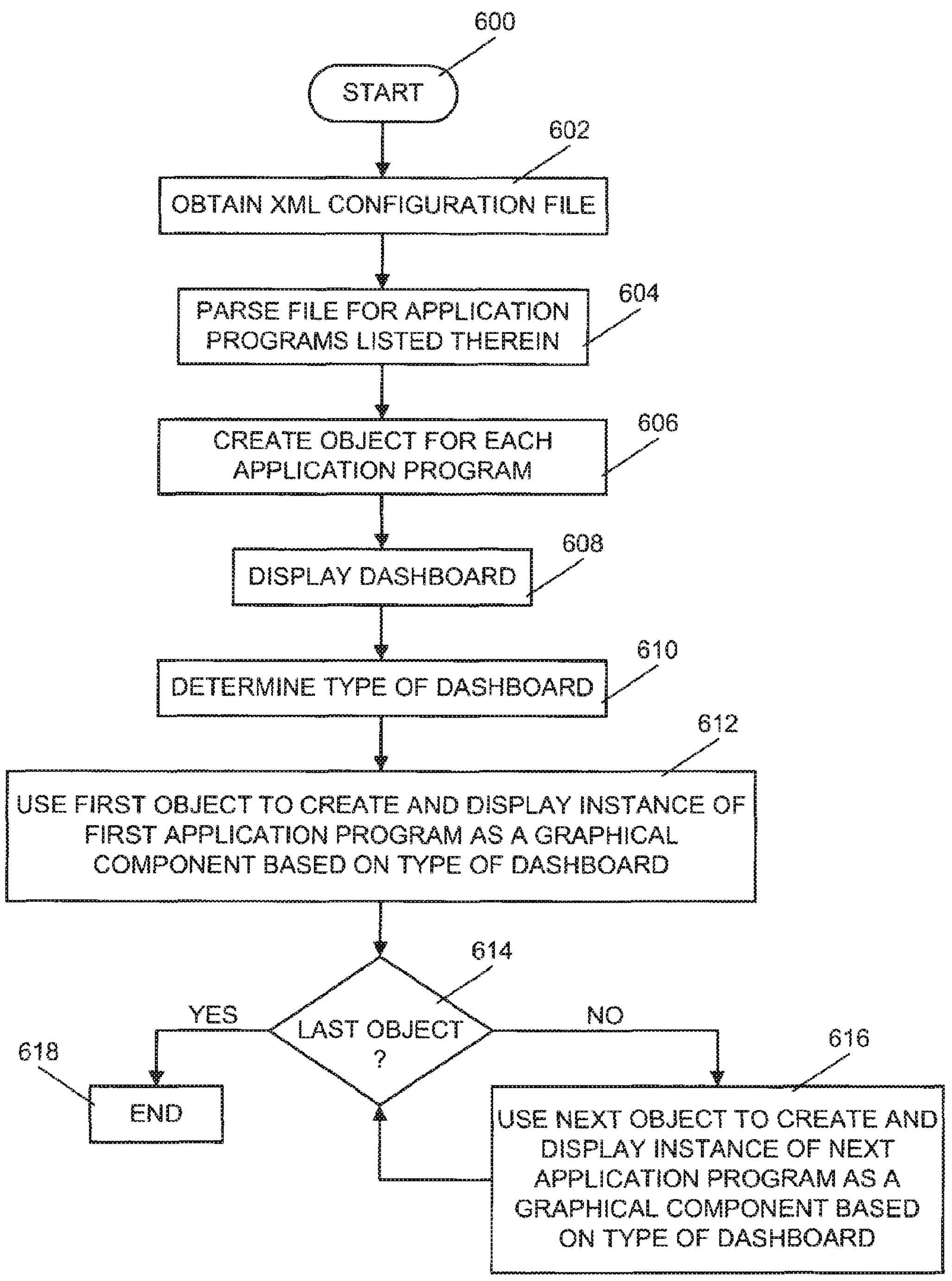

600
START
602
OBTAIN XML CONFIGURATION FILE
604
PARSE FILE FOR APPLICATION PROGRAMS LISTED THEREIN
606
CREATE OBJECT FOR EACH APPLICATION PROGRAM
608
DISPLAY DASHBOARD
610
DETERMINE TYPE OF DASHBOARD
612
USE FIRST OBJECT TO CREATE AND DISPLAY INSTANCE OF FIRST APPLICATION PROGRAM AS A GRAPHICAL COMPONENT BASED ON TYPE OF DASHBOARD
614
LAST OBJECT ?
YES
NO
618
END
616
USE NEXT OBJECT TO CREATE AND DISPLAY INSTANCE OF NEXT APPLICATION PROGRAM AS A GRAPHICAL COMPONENT BASED ON TYPE OF DASHBOARD

FIG. 6

SELECTING GRAPHICAL COMPONENT TYPES AT RUNTIME

BACKGROUND OF THE INVENTION

1 . Technical Field

The present invention is directed to software applications. More specifically, the present invention is directed to a system, apparatus and method of selecting graphical component types at runtime.

2 . Description of Related Art

A dashboard is a graphical user interface (GUI) on which selectable application instances are displayed. Every application represented on the dashboard is an instance of a specific application type. An example of an application type is "System". An example of a System application type may be "shutdown". When an instance of a System application type has been configured with appropriate configuration information to shut the system down, the dashboard will display a graphical component which when selected will do so.

The display of graphical components may vary. For example, a graphical component may be displayed as a menu item or menuItem widget, a tree item or treeItem widget, a toolbar widget, a drop-down menu widget, a button et cetera. A widget is a software application written in JAVA™ (ORACLE® and JAVA are registered trademarks of Oracle and/or its affiliates).

Generally, if a dashboard is configured to be menu-based, the graphical components display thereon will be menultem widgets. If the dashboard is instead configured to be tree-based, the graphical components that will be displayed on the dashboard will be treeltem widgets and so on. Further, if a dashboard is configured to be a full-fledged dashboard (i.e., the dashboard is configured to show all application instances with all their functionalities), a user will be able to access all the functionalities provided by the application instances. If, on the other hand, the dashboard is configured to be a minimalist dashboard (i.e., the dashboard is configured to show application instances with only tool tips, for example, and no functionalities), only the tool tips will be available to the user (i.e., the user should not be able to access any of the functionalities provided by the application instances).

Based on the above description, "type" in the context of the present invention will henceforth be used to refer to both the presentation of a selectable application instance or its "look and feel" (e.g., the display presentation of a shutdown graphical component or widget) on the dashboard and its behavior when selected (e.g., shutting down the system). Note that "type" used with dashboard and graphical component should not be confused with "type" used with application. "Type" used with application refers to the application program whereas "type used with dashboard and graphical component is used to refer to look, feel and behavior.

Presenting different types of graphical components while using the same data can be rather advantageous. For example, if an employee is very well accustomed with menu-driven dashboards, the dashboard used by the employee may be configured to be menu-based. If another employee is more familiar with tree-based dashboards, his/her dashboard may be configured to be tree-based. If both employees are from the same department, their dashboards, although are of different types, may nonetheless provide the

same functionality. A visiting individual, on the other hand, may be provided with a minimalist dashboard for restricted functionality.

Since the same data is being used in all instances described above, there is a need to determine automatically the type of graphical components to display in each situation.

SUMMARY OF THE INVENTION

The present invention provides a system, apparatus and method of selecting graphical component types at runtime. When a graphical component is to be displayed in a GUI, which usually has a type, the type of the GUI is first determined. Type in this case is used to signify a look, feel and behavior that are to be exhibited by the graphical component. After determining the type of the GUI, the graphical component may be created based on the type of the GUI. After it has been created, the graphical component will be displayed in the GUI.

Generally, each graphical component in the GUI represents an instantiation of an application program. Hence, the program may be accessed through the graphical component. Obviously, programs that are not to be accessible to a user will not be represented on the GUI by a graphical component. Thus, the invention is ideal for situations where full accessibility to a system is to be limited and controlled.

BRIEF DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself, however, as well as a preferred mode of use, further objectives and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in conjunction with the accompanying drawings, wherein:

FIG. **1** is an exemplary block diagram illustrating a distributed data processing system according to the present invention.

FIG. **2** is an exemplary block diagram of a server apparatus according to the present invention.

FIG. **3** is an exemplary block diagram of a client apparatus according to the present invention.

FIGS. **4**(*a*)-**4**(*f*) depict an exemplary XML configuration file that may be used by the present invention.

FIG. **5** is a conceptual view of a plurality of plug-ins that may be used by the present invention.

FIG. **6** is a flowchart of a process that may be used to implement the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference now to the figures, FIG. **1** depicts a pictorial representation of a network of data processing systems in which the present invention may be implemented. Network data processing system **100** is a network of computers in which the present invention may be implemented. Network data processing system **100** contains a network **102**, which is the medium used to provide communications links between various devices and computers connected together within network data processing system **100**. Network **102** may include connections, such as wire, wireless communication links, or fiber optic cables.

In the depicted example, server **104** is connected to network **102** along with storage unit **106**. In addition, clients

108, **110**, and **112** are connected to network **102**. These clients **108**, **110**, and **112** may be, for example, personal computers or network computers. In the depicted example, server **104** provides data, such as boot files, operating system images, and applications to clients **108**, **110** and **112**. Clients **108**, **110** and **112** are clients to server **104**. Network data processing system **100** may include additional servers, clients, and other devices not shown. In the depicted example, network data processing system **100** is the Internet with network **102** representing a worldwide collection of networks and gateways that use the transmission control protocol/Internet protocol (TCP/IP) suite of protocols to communicate with one another. At the heart of the Internet is a backbone of high-speed data communication lines between major nodes or host computers, consisting of thousands of commercial, government, educational and other computer systems that route data and messages. Of course, network data processing system **100** also may be implemented as a number of different types of networks, such as for example, an intranet, a local area network (LAN), or a wide area network (WAN). FIG. **1** is intended as an example, and not as an architectural limitation for the present invention.

Referring to FIG. **2**, a block diagram of a data processing system that may be implemented as a server, such as server **104** in FIG. **1**, is depicted in accordance with a preferred embodiment of the present invention. Data processing system **200** may be a symmetric multiprocessor (SMP) system including a plurality of processors **202** and **204** connected to system bus **206**. Alternatively, a single processor system may be employed. Also connected to system bus **206** is memory controller/cache **208**, which provides an interface to local memory **209**. Input/output (I/O) bus bridge **210** is connected to system bus **206** and provides an interface to I/O bus **212**. Memory controller/cache **208** and I/O bus bridge **210** may be integrated as depicted.

Peripheral component interconnect (PCI) bus bridge **214** connected to I/O bus **212** provides an interface to PCI local bus **216**. A number of modems may be connected to PCI local bus **216**. Typical PCI bus implementations will support four PCI expansion slots or add-in connectors. Communications links to network computers **108**, **110** and **112** in FIG. **1** may be provided through modem **218** and network adapter **220** connected to PCI local bus **216** through add-in boards.

Additional PCI bus bridges **222** and **224** provide interfaces for additional PCI local buses **226** and **228**, from which additional modems or network adapters may be supported. In this manner, data processing system **200** allows connections to multiple network computers. A memory-mapped graphics adapter **230** and hard disk **232** may also be connected to I/O bus **212** as depicted, either directly or indirectly.

Those of ordinary skill in the art will appreciate that the hardware depicted in FIG. **2** may vary. For example, other peripheral devices, such as optical disk drives and the like, also may be used in addition to or in place of the hardware depicted. The depicted example is not meant to imply architectural limitations with respect to the present invention.

The data processing system depicted in FIG. **2** may be, for example, an IBM® e-Server pSeries system, a product of International Business Machines Corporation in Armonk, New York, running the Advanced Interactive Executive (AIX®) operating system (IBM, e-Server, pSeries, and AIX are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both) or LINUX® operating system (LINUX is a registered trademark of Linus Torvalds in the United States, other countries, or both).

With reference now to FIG. **3**, a block diagram illustrating a data processing system is depicted in which the present invention may be implemented. Data processing system **300** is an example of a client computer. Data processing system **300** employs a peripheral component interconnect (PCI) local bus architecture. Although the depicted example employs a PCI bus, other bus architectures such as Accelerated Graphics Port (AGP) and Industry Standard Architecture (ISA) may be used. Processor **302** and main memory **304** are connected to PCI local bus **306** through PCI bridge **308**. PCI bridge **308** also may include an integrated memory controller and cache memory for processor **302**. Additional connections to PCI local bus **306** may be made through direct component interconnection or through add-in boards. In the depicted example, local area network (LAN) adapter **310**, SCSI host bus adapter **312**, and expansion bus interface **314** are connected to PCI local bus **306** by direct component connection. In contrast, audio adapter **316**, graphics adapter **318**, and audio/video adapter **319** are connected to PCI local bus **306** by add-in boards inserted into expansion slots. Expansion bus interface **314** provides a connection for a keyboard and mouse adapter **320**, modem **322**, and additional memory **324**. Small computer system interface (SCSI) host bus adapter **312** provides a connection for hard disk drive **326**, tape drive **328**, and compact disk read-only-memory (CD-ROM) and digital versatile disk (DVD) CD-ROM/DVD drive **330**. Typical PCI local bus implementations will support three or four PCI expansion slots or add-in connectors.

An operating system runs on processor **302** and is used to coordinate and provide control of various components within data processing system **300** in FIG. **3**. The operating system may be a commercially available operating system, such as WINDOWS® XP™ (WINDOWS® XP™ are either registered trademarks or trademarks of Microsoft Corporation in the U.S.A. and/or other regions and/or countries) which is available from Microsoft Corporation. An object oriented programming system such as JAVA may run in conjunction with the operating system and provide calls to the operating system from JAVA programs or applications executing on data processing system **300**. Instructions for the operating system, the object-oriented operating system, and applications or programs are located on storage devices, such as hard disk drive **326**, and may be loaded into main memory **304** for execution by processor **302**.

Those of ordinary skill in the art will appreciate that the hardware in FIG. **3** may vary depending on the implementation. Other internal hardware or peripheral devices, such as flash ROM (or equivalent nonvolatile memory) or optical disk drives and the like, may be used in addition to or in place of the hardware depicted in FIG. **3**. Also, the processes of the present invention may be applied to a multiprocessor data processing system.

As another example, data processing system **300** may be a stand-alone system configured to be bootable without relying on some type of network communication interface, whether or not data processing system **300** comprises some type of network communication interface. As a further example, data processing system **300** may be a Personal Digital Assistant (PDA) device, which is configured with ROM and/or flash ROM in order to provide non-volatile memory for storing operating system files and/or user-generated data.

The depicted example in FIG. **3** and above-described examples are not meant to imply architectural limitations.

For example, data processing system **300** may also be a notebook computer or hand held computer in addition to taking the form of a PDA. Data processing system **300** also may be a kiosk or a Web appliance.

The present invention provides a system, apparatus and method of selecting graphical component types at runtime. The invention may be local to client systems **108**, **110** and **112** of FIG. **1** or to the server **104** or to both the server **104** and clients **108**, **110** and **112**. Further, the present invention may reside on any data storage medium (i.e., floppy disk, compact disk, hard disk, ROM, random access memory (RAM), etc.) used by a computer system.

In implementing the invention, an application catalog is used. The application catalog is an extensible Markup Language (XML) file that contains ostensibly configuration information for all applications that may be displayed on a particular dashboard. The application catalog may be referred to as a configuration file since it contains configuration information for the applications listed therein. Consequently, XML configuration file and XML application catalog will henceforth be used interchangeably. The XML configuration file may be stored on server **104**. Upon being turned on or reset, a client (i.e., any one of clients **108**, **110** and **112**) may download the XML configuration file from server **104**.

FIGS. **4**(*a*)-**4**(*f*) depict an exemplary XML configuration file. The XML configuration file has a plurality of applications. The applications include (1) "tasklist" (see lines [002]-[013]); (2) "shutdown" on lines [014]-[032]; (3) "logoff" on lines [033]-[050]; (4) "lockup" on lines [051]-[068]; (5) "exit" on lines [069]-[086]; (6) "native" on lines [087]-[126]; (6) "web" on lines [127]-[150]; and (7) "java" on lines [151]-[234].

As mentioned earlier, an instance of each one of these applications may be displayed on a dashboard as a graphical component. When the "tasklist" graphical component is selected, a list of all currently open applications that are native to the operating system may be displayed. If the operating system is MICROSOFT® WINDOWS® operating system (MICROSOFT and WINDOWS are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries), for example, all open native WINDOWS applications will be displayed. In this regard, "tasklist" provides the same function as a WINDOWS task manager.

A "shutdown" graphical component, as described previously, may be used to shut the system down whereas a "logoff" or "lockup" graphical component may be used to log a user the system, or lock the system up so that no one else may use it, respectively. An "exit" graphical component may be used to exit the system in an emergency situation. A "native" graphical component gives a user access in a lockdown environment. If the access is to MICROSOFT WORD, for example, when the displayed graphical component is selected, MICROSOFT WORD will open. A "web" graphical component may open a Web browser and a "JAVA" graphical component may give a user access to the JAVA programming language.

In order not to obfuscate the disclosure of the invention, only the information in the XML configuration that is deemed pertinent for a thorough understanding of the invention will be explained. Specifically, only the information in the "tasklist" application (i.e., information on lines [002]-[013]) will be explained.

On line [002] a unique identification number (i.e., ID =100) is assigned to the application program. Unique IDs allow a system to distinguish one application program from another. Particularly, IDs are used for creating access control lists for client systems. In the example above where there are two employees working in the same department, the client systems used by both employees may be assigned the same set of IDs for accessibility. So, if applications **100**, **101** and **201** were assigned to the two employees only the "tasklist", "shutdown", and "native" graphical components would be displayed on the dashboard displayed on their workstation.

On line [002], the application program is also assigned a name (e.g., tasklist). The configuration section starts on line [003] and ends on line [012]. On line [004] it is stated that the information that will be read from line [005] should be treated as a text block. A name or "Title" to the configuration information is assigned on line [005]. This may be used to display a text in the case of a dashboard where text is to be displayed or tool tips.

The "Title" can have two values, a default value (i.e., a German Title as called for on line [008]) or a value of a particular locale (a Japanese Title in this case as stated on line [009]). Thus, if the system fails to find a locale specific value that matches the system setting, then use the default which will have been set at the very beginning of the XML configuration file. The rest of the lines are used to close tags. In XML, each tag that is opened (e.g., <application>) must be closed (e.g., </application>).

Note that the invention is not restricted to only those two languages (i.e., Japanese and German). There can be as many languages defined in that section as needed. For example, if the system is anticipated to be used in ten countries having each a different language, there may be ten different languages defined in that section.

Note also that although in this present example the configuration file is an XML file, the invention is not limited to the use of XML files. Any other type of file may be used so long as the file contains configuration information for all application instances that may be displayed on a dashboard. Thus, the use of an XML file as the configuration file is for illustrative purposes only. In addition, note that the invention is not restricted to having the XML configuration file be stored on server **104**. The XML configuration file may be stored on one or all of clients **108**, **110** and **112** in conjunction to or instead of being stored on server **104**. Obviously, if the XML configuration file is stored on a local system, it need not be downloaded from another system. By contrast, if the XML configuration file is stored on a peer system, instead of or in conjunction to being stored on server **104**, it may be downloaded from the peer system or from either the peer system or the server **104**, respectively.

In conjunction with the XML configuration file, the present invention makes use of a plurality of plug-ins. A plug-in is a software module that adds a specific feature or service to a system. FIG. **5** is a conceptual view of the plug-ins used by the invention in relation to the OS. As shown in the figure, platform **504** is plugged into operating system **502**. Also plugged into operating system **502** and platform **504** as well as to each other are dashboard **506** and application type **508**.

Platform plug-in **504** is used to parse the XML configuration file for configured applications. For each application listed in the XML configuration file, the platform plug-in **504** will create an applicationInstance object. As is well known in the art, the object will have the type, identification, name, icon et cetera. needed to create an instance of the application.

When a dashboard is to be displayed on the screen of the client, dashboard plug-in **506** will request the application Instance objects from platform **504**. After receiving the set of application Instance objects, the dashboard plug-in **506** will parse the set of objects to determine the application type (i.e., the particular application program to call). Dashboard plug-in **506** will call each application type in order for the application program to instantiate itself. An application type is a set of classes that takes the information on the application object and uses that data for the creation of the selectable application instance. There is an application type **508** for each application program in the XML configuration file. After calling all the application types **508**, Dashboard plug-in **506** will display itself on the screen.

The dashboard plug-in **506** is a class that has an overall widget "theme" or "type" (i.e., tree, menu, table, voice, etc.). The application type **508** is responsible for determining this "theme" (i.e., the type of the calling dashboard) in order to create the appropriate widget as well as set the appropriate behavior of the widget when selected. After determining the type of the calling dashboard, the application type will instantiate itself and display itself as a widget on the dashboard that will have the look and feel and behavior corresponding to the type of the dashboard.

FIG. **6** is a flowchart of a process that may be used to implement the invention. The process starts when a client is turned on or is reset (step **600**). After being turned on or reset, the client will download an XML configuration file from a server (step **602**). In the XML configuration file will be a list of configured application programs. The list of configured application programs will include all application programs that are accessible by the client. The file will be parsed for the list of the configured application programs (step **604**). For each configured application program, an applicationInstance object will be created (step **606**). The dashboard to be displayed on the client will be instantiated (step **608**). Each application object will be called. When an applicationInstance object is called, it will instantiate itself. Before instantiating itself, however, it will determine the type of the dashboard on which it is to be displayed by looking at the dashboard plug-in class. Based on the type of the dashboard, an appropriate graphical component will be displayed on the dashboard. The graphical component will have a look and feel and behavior based on the type of the dashboard (steps **610**-**616**). After all the graphical components have been displayed, the process will end (step **618**).

The description of the present invention has been presented for purposes of illustration and description, and is not intended to be exhaustive or limited to the invention in the form disclosed. Many modifications and variations will be apparent to those of ordinary skill in the art. The embodiment was chosen and described in order to best explain the principles of the invention, the practical application, and to enable others of ordinary skill in the art to understand the invention for various embodiments with various modifications as are suited to the particular use contemplated.

What is claimed is:

1. A method of displaying, on a display of a computer system, graphical components representing applications which are executable by an operating system (OS) executing on the computer system to which a user has access permission, the method comprising:

the computer system determining, at runtime, a predetermined control list to use, wherein the predetermined control list identifies each of the applications by an assigned unique identifier to which the user has the access permission and which are each to be represented by one of the graphical components, and wherein the predetermined control list used is associated with the user in response to a client device associated with the user performing one of a power on operation or a reset operation and is located on a selected one of a client, a server or a peer system;

creating an object, by the computer system using a platform plug-in, for each application of the applications in the predetermined control list to form a set of objects, wherein each object comprises information including a type, an identification, a name, and an icon needed to create an instance of a respective application;

parsing the set of objects, by the computer system using a dashboard plug-in, to determine an application type for a respective object;

the computer system determining, at runtime, using the application type in examining the dashboard plug-in, a particular type of calling dashboard from a set of types comprising a tree type, a menu type, a table type and a voice type to be used for the user, wherein the particular type of calling dashboard defines an overall theme that defines both a look of a dashboard and a behavior of the graphical components displayed on the dashboard when selected;

each application of the applications creating, in response to a determination of the particular type of calling dashboard at runtime, using an application type plug-in with a respective application type and the respective object, a selectable application instance as a respective graphical component for itself to form the graphical components representing the applications identified in the predetermined control list corresponding to the particular type of calling dashboard determined; and

the computer system displaying on the dashboard, the created graphical components that represent the applications identified in the predetermined control list specifically for the particular type of calling dashboard determined.

2. The method of claim **1**, wherein each created graphical component represents an instantiation of a given application of the applications identified in the predetermined control list.

3. The method of claim **2**, wherein the predetermined control list identifies an emergency exit application to exit the computer system on which the graphical components are displayed in an emergency situation, and wherein the computer system is exited upon selection of a graphical component representing the emergency exit application.

4. The method of claim **2**, wherein a calling dashboard is a plug-in to the OS and, wherein a platform plug-in to the OS is used to parse the predetermined control list for the applications to which the user has the access permission and to create the instantiation of each one of the applications to which the user has the access permission.

5. The method of claim **4**, wherein an application type plug-in to the OS is used to create the selectable application instance for a particular application program identified in the predetermined control list.

6. The method of claim **5**, wherein the application type plug-in determines an overall widget theme to create an appropriate widget as a graphical component representing an application in the predetermined control list and to set an appropriate behavior for the widget when selected.

7. The method of claim **6**, wherein there is a given application type plug-in for each one of the applications identified in the predetermined control list that determines the overall widget theme in order to create an appropriate widget as a graphical component representing a given application in the predetermined control list and to set a given appropriate behavior for a given widget when selected.

8. The method of claim **1**, wherein displaying on the dashboard the created graphic components comprises:
   each application of the applications instantiating itself and displaying its respective graphical component on the dashboard.

9. The method of claim **1**, wherein a plurality of types of calling dashboards comprises a menu type and a tree type, and wherein the graphical components are created using a same set of data notwithstanding which one of the plurality of types of calling dashboard is determined to be used at runtime.

10. A computer program product for displaying, on a display of a computer system, graphical components representing applications which are executable by an operating system (OS) executing on the computer system to which a user has access permission, comprising a non-transitory computer data storage medium having stored thereon computer program code which when executed by a processor direct the computer system to:
   determine by the computer system, at runtime, a predetermined control list to use, wherein the predetermined control list identifies each of the applications by an assigned unique identifier to which the user has the access permission and which are each to be represented by one of the graphical components, and wherein the predetermined control list used is associated with the user in response to a client device associated with the user performing one of a power on operation or a reset operation and is located on a selected one of a client, a server or a peer system ;
   create an object for each application of the applications in the predetermined control list to form a set of objects, wherein each object comprises information including a type, an identification, a name, and an icon needed to create an instance of a respective application;
   parse the set of objects using a dashboard plug-in to determine an application type for a respective object;
   determine by the computer system, at runtime, using the application type in examining the dashboard plug-in, a particular type of calling dashboard from a set of types comprising a tree type, a menu type, a table type and a voice type to be used for the user, wherein the particular type of calling dashboard defines an overall theme that defines both a look of a dashboard and a behavior of the graphical components displayed on the dashboard when selected, and wherein the particular type of calling dashboard is a plug-in to the operating system;
   create, for each application of the applications, in response to a determination of the particular type of calling dashboard at runtime, using an application type plug-in with a respective application type and the respective object, a selectable application instance as a respective graphical component for itself to form the graphical components representing the applications identified in the predetermined control list corresponding to the particular type of calling dashboard determined, wherein each created graphical component represents an instantiation of a given application of the applications identified in the predetermined control list; and
   display on the dashboard by the computer system the created graphical components that represent the applications identified in the predetermined control list, wherein a platform plug-in to the OS is used to parse the predetermined control list for the applications to which the user has the access permission and to create the instantiation of each one of the applications to which the user has the access permission specifically for the particular type of calling dashboard determined.

11. The computer program product of claim **10**, wherein the predetermined control list identifies an emergency exit application to exit the computer system on which the graphical components are displayed in an emergency situation, and wherein the computer system is exited upon selection of a graphical component representing the emergency exit application.

12. The computer program product of claim **10**, wherein an application type plug-in to the OS is used to create the selectable application instance for a particular application program identified in the predetermined control list.

13. The computer program product of claim **10**, wherein program code for the computer system to display on the dashboard the created graphic components comprises:
   program code for each application of the applications to instantiate itself and display its respective graphical component on the dashboard.

14. The computer program product of claim **10**, wherein a plurality of types of calling dashboards comprises a menu type and a tree type, and wherein the graphical components are created using a same set of data notwithstanding which particular type of calling dashboard is determined to be used at runtime.

15. A system for displaying on a display of a computer system graphical components representing executable applications executable by an operating system (OS) executing on the computer system to which a user has access permission, comprising:
   at least one storage device that stores code data; and
   at least one processor that processes the code data to:
   determine, at runtime, a predetermined control list to use, wherein the predetermined control list identifies each of the applications by an assigned unique identifier to which the user has the access permission and which are each to be represented by one of the graphical components, and wherein the predetermined control list used is associated with the user in response to a client device associated with the user performing one of a power on operation or a reset operation and is located on a selected one of a client, a server or a peer system;
   create an object, for each application of the applications in the predetermined control list, list to form a set of objects, wherein each object comprises information including a type, an identification, a name, and an icon needed to create an instance of a respective application;
   parse the set of objects, using a dashboard plug-in, to determine an application type for a respective object;
   determine, at runtime, using the application type in examining the dashboard plug-in, a particular type of calling dashboard from a set of types comprising a tree type, a menu type, a table type and a voice type to be used for the user, wherein the particular type of calling dashboard defines an overall theme that defines both a look of a dashboard and a behavior of the graphical components displayed on the dashboard when selected;
   create, using an application type plug-in with a respective application type and the respective object, a selectable application instance, by each application of the applications in response to a determination of the particular type of calling dashboard at runtime, as a respective graphical component for itself to form the graphical components representing the applications identified in the predetermined control list corresponding to the particular type of calling dashboard determined; and

display on the dashboard the created graphical components that represent the applications identified in the predetermined control list specifically for the particular type of calling dashboard determined, wherein each created graphical component represents an instantiation of a given application of the applications identified in the predetermined control list, wherein the particular type of calling dashboard is a plug-in to the operating system, and wherein a platform plug-in to the OS is used to parse the predetermined control list for the applications to which the user has the access permission and to create the instantiation of each one of the applications to which the user has the access permission.

16. The system of claim **15**, wherein the predetermined control list identifies an emergency exit application to exit the computer system on which the graphical components are displayed in an emergency situation, and wherein the computer system is exited upon selection of a graphical component representing the emergency exit application.

17. The system of claim **15**, wherein an application type plug-in to the OS is used to create the selectable application instance for a particular application program identified in the predetermined control list.

18. The system of claim **15**, wherein the program code data to display on the dashboard by the computer system the created graphic components comprises:

code data for each application of the applications to instantiate itself and display its respective graphical component on the particular type of calling dashboard.

19. The system of claim **15**, wherein a plurality of types of calling dashboards comprises a menu type and a tree type, and wherein the graphical components are created using a same set of data notwithstanding which particular type of calling dashboard is determined to be used at runtime.

* * * * *